



Northern Long-Eared Bat

Myotis septentrionalis

The northern long-eared bat is federally listed as a threatened species under the Endangered Species Act. **Endangered** species are animals and plants that are in danger of becoming extinct. **Threatened** species are animals and plants that are likely to become endangered in the foreseeable future. Identifying, protecting and restoring endangered and threatened species is the primary objective of the U.S. Fish and Wildlife Service's Endangered Species Program.

What is the northern long-eared bat?

Appearance: The northern long-eared bat is a medium-sized bat with a body length of 3 to 3.7 inches and a wingspan of 9 to 10 inches. Their fur color can be medium to dark brown on the back and tawny to pale-brown on the underside. As its name suggests, this bat is distinguished by its long ears, particularly as compared to other bats in its genus, *Myotis*.

Winter Habitat: Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. Within hibernacula, surveyors find them hibernating most often in small crevices or cracks, often with only the nose and ears visible.

Summer Habitat: During the summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags (dead trees). Males and non-reproductive females may also roost in cooler places, like caves and mines. Northern long-eared bats seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices. They rarely roost in human structures like barns and sheds.

Reproduction: Breeding begins in late summer or early fall when males begin to swarm near hibernacula. After

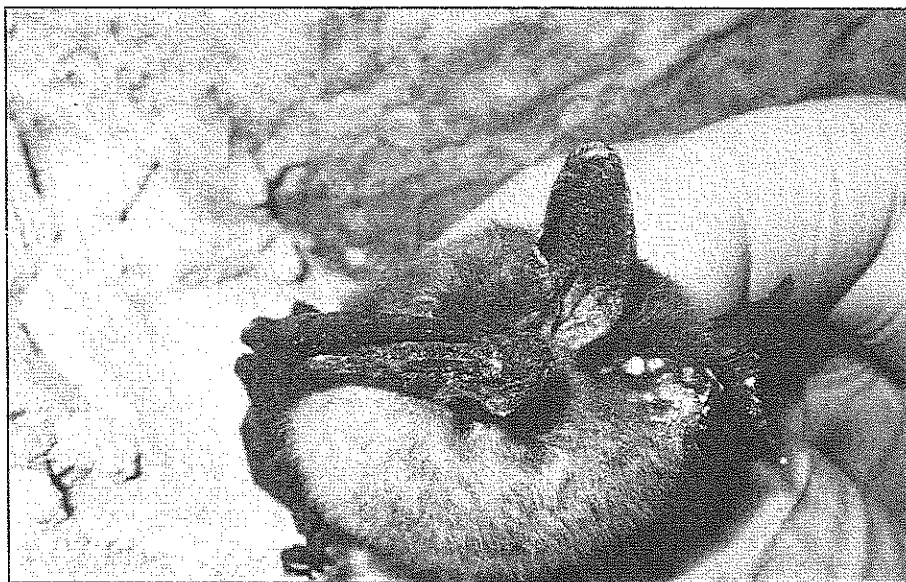


Photo by Steve Taylor, University of Illinois

This northern long-eared bat, observed during an Illinois mine survey, shows visible symptoms of white-nose syndrome.

copulation, females store sperm during hibernation until spring. In spring, females emerge from their hibernacula, ovulate and the stored sperm fertilizes an egg. This strategy is called delayed fertilization.

After fertilization, pregnant bats migrate to summer areas where they roost in small colonies and give birth to a single pup. Maternity colonies of females and young generally have 30 to 60 bats at the beginning of the summer, although larger maternity colonies have also been observed. Numbers of bats in roosts typically decrease from the time of pregnancy to post-lactation. Most bats within a maternity colony give birth around the same time, which may occur from late May or early June to late July, depending where the colony is located within the species' range. Young bats start flying by 18 to 21 days after birth. Maximum lifespan for the northern long-eared bat is estimated to be up to 18.5 years.

Feeding Habits: Like most bats, northern long-eared bats emerge at dusk to feed. They primarily fly through the

understory of forested areas feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch while in flight using echolocation or by gleaning motionless insects from vegetation.

Range: The northern long-eared bat's range includes much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. The species' range includes 37 States and the District of Columbia: Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming.

Why is the northern long-eared bat in trouble?

White-nose Syndrome: No other threat is as severe and immediate as

this. If this disease had not emerged, it is unlikely that northern long-eared bat populations would be experiencing such dramatic declines. Since symptoms were first observed in New York in 2006, white-nose syndrome has spread rapidly from the Northeast to the Midwest and Southeast; an area that includes the core of the northern long-eared bat's range, where it was most common before this disease. Numbers of northern long-eared bats (from hibernacula counts) have declined by up to 99 percent in the Northeast. Although there is uncertainty about the rate that white-nose syndrome will spread throughout the species' range, it is expected to continue to spread throughout the United States in the foreseeable future.

Other Sources of Mortality:

Although no significant population declines have been observed due to the sources of mortality listed below, they may now be important factors affecting this bat's viability until we find ways to address WNS.

Impacts to Hibernacula: Gates or other structures intended to exclude people from caves and mines not only restrict bat flight and movement, but also change airflow and microclimates. A change of even a few degrees can make a cave unsuitable for hibernating bats. Also, cave-dwelling bats are vulnerable to human disturbance while hibernating. Arousal during hibernation causes bats to use up their energy stores, which may lead to bats not surviving through winter.

Loss or Degradation of Summer Habitat:

Highway construction, commercial development, surface mining, and wind facility construction permanently remove habitat and are activities prevalent in many areas of this bat's range. Many forest management activities benefit bats by keeping areas forested rather than converted to other uses. But, depending on type and timing, some forest management activities can cause mortality and temporarily remove or degrade roosting and foraging habitat.

Wind Farm Operation: Wind turbines kill bats, and, depending on the species, in very large numbers. Mortality from windmills has been documented for northern long-eared bats, although a

small number have been found to date. However, there are many wind projects within a large portion of the bat's range and many more are planned.

What Is Being Done to Help the Northern Long-Eared Bat?

Disease Management: Actions have been taken to try to reduce or slow the spread of white-nose syndrome through human transmission of the fungus into caves (e.g. cave and mine closures and advisories; national decontamination protocols). A national plan was prepared by the Service and other state and federal agencies that details actions needed to investigate and manage white-nose syndrome. Many state and federal agencies, universities and non-governmental organizations are researching this disease to try to control its spread and address its affect. See www.whitenosesyndrome.org/ for more.

Addressing Wind Turbine

Mortality: The Service and others are working to minimize bat mortality from wind turbines on several fronts. We fund and conduct research to determine why bats are susceptible to turbines, how to operate turbines to minimize mortality and where important bird and bat migration routes are located. The Service, state natural resource agencies, and the wind energy industry are developing a Midwest Wind Energy Habitat Conservation Plan, which will provide wind farms a mechanism to continue operating legally while minimizing and mitigating listed bat mortality.

Listing: The northern long-eared bat is listed as a threatened species under the federal Endangered Species Act. Listing a species affords it the protections of the Act and also increases the priority of the species for funds, grants, and recovery opportunities.

Hibernacula Protection: Many federal and state natural resource agencies and conservation organizations have protected caves and mines that are important hibernacula for cave-dwelling bats.

What Can I Do?

Do Not Disturb Hibernating Bats:

To protect bats and their habitats, comply with all cave and mine closures, advisories, and regulations. In areas without a cave and mine closure policy, follow approved decontamination protocols (see <http://whitenosesyndrome.org/topics/decontamination>). Under no circumstances should clothing, footwear, or equipment that was used in a white-nose syndrome affected state or region be used in unaffected states or regions.

Leave Dead and Dying Trees

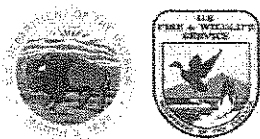
Standing: Like most eastern bats, the northern long-eared bat roosts in trees during summer. Where possible and not a safety hazard, leave dead or dying trees on your property. Northern long-eared bats and many other animals use these trees.

Install a Bat Box: Dead and dying trees are usually not left standing, so trees suitable for roosting may be in short supply and bat boxes may provide additional roost sites. Bat boxes are especially needed from April to August when females look for safe and quiet places to give birth and raise their pups.

Support Sustainability: Support efforts in your community, county and state to ensure that sustainability is a development goal. Only through sustainable living will we provide rare and declining species, like the northern long-eared bat, the habitat and resources they need to survive alongside us.

Spread the Word: Understanding the important ecological role that bats play is a key to conserving the northern long-eared and other bats. Helping people learn more about the northern long-eared bat and other endangered species can lead to more effective recovery efforts. For more information, visit www.fws.gov/midwest/nleb and www.whitenosesyndrome.org

Join and Volunteer: Join a conservation group; many have local chapters. Volunteer at a local nature center, zoo, or national wildlife refuge. Many state natural resource agencies benefit greatly from citizen involvement in monitoring wildlife. Check your state agency websites and get involved in citizen science efforts in your area.



U.S. Fish & Wildlife Service

Threatened and Endangered Species

Indiana Bat (*Myotis sodalis*)

The Indiana bat is an endangered species. Endangered species are animals and plants that are in danger of becoming extinct. Threatened species are those that are likely to become endangered in the foreseeable future. Identifying, protecting, and restoring endangered and threatened species are primary objectives of the U.S. Fish and Wildlife Service's endangered species program.

What is the Indiana Bat?

Description

The scientific name of the Indiana bat is *Myotis sodalis* and it is an accurate description of the species. *Myotis* means "mouse ear" and refers to the relatively small, mouse-like ears of the bats in this group. *Sodalis* is the Latin word for "companion." The Indiana bat is a very social species; large numbers cluster together during hibernation. The species is called the Indiana bat because the first specimen described to science in 1928 was based on a specimen found in southern Indiana's Wyandotte Cave in 1904.

The Indiana bat is quite small, weighing only one-quarter of an ounce (about the weight of three pennies). In flight, it has a wingspan of 9 to 11 inches. The fur is dark-brown to black. The Indiana bat is similar in appearance to many other related species. Biologists can distinguish it from similar species by comparing characteristics such as the structure of the foot and color variations in the fur.

Habitat

Indiana bats hibernate during winter in caves or, occasionally, in abandoned mines. For hibernation, they require cool, humid caves with stable temperatures, under 50° F but above freezing. Very few caves within the range of the species have these conditions.



Photo by Rich Fields

Indiana bats eat up to half their body weight in insects each night.

Hibernation is an adaptation for survival during the cold winter months when no insects are available for bats to eat. Bats must store energy in the form of fat before hibernating. During the six months of hibernation the stored fat is their only source of energy. If bats are disturbed or cave temperatures increase, more energy is needed and hibernating bats may starve.

After hibernation, Indiana bats migrate to their summer habitat in wooded areas where they usually roost under loose tree bark on dead or dying trees. During summer, males roost alone or in small groups, while females roost in larger groups of up to 100 bats or more. Indiana bats also forage in or along the edges of forested areas.

Reproduction

Indiana bats mate during fall before they enter caves to hibernate. Females store the sperm through winter and become pregnant in spring soon after they emerge from the caves.

After migrating to their summer areas, females roost under the peeling bark of dead and dying trees in groups of up to 100 or more. Such groups are called maternity colonies. Each female in the colony gives birth to only one pup per year. Young bats are nursed by the mother, who leaves the roost tree only to forage for food. The young stay with the maternity colony throughout their first summer.

Feeding Habits

Indiana bats eat a variety of flying insects found along rivers or lakes and in uplands. Like all insect-eating bats, they benefit people by consuming insects that are considered pests or otherwise harmful to humans. Their role in insect control is not insignificant – Indiana bats eat up to half their body weight in insects each night.

Range

Indiana bats are found over most of the eastern half of the United States. Almost half of all Indiana bats (207,000

in 2005) hibernate in caves in southern Indiana. In 2005, other states which supported populations of over 40,000 included Missouri (65,000), Kentucky (62,000), Illinois (43,000) and New York (42,000). Other states within the current range of the Indiana bat include Alabama, Arkansas, Connecticut, Iowa, Maryland, Michigan, New Jersey, North Carolina, Ohio, Oklahoma, Pennsylvania, Tennessee, Vermont, Virginia, West Virginia. The 2005 population estimate is about 457,000 Indiana bats, half as many as when the species was listed as endangered in 1967.

Why is the Indiana Bat Endangered?

Human Disturbance

Indiana bats, because they hibernate in large numbers in only a few caves, are extremely vulnerable to disturbance. During hibernation, they cluster in groups of up to 500 per square foot. Since the largest hibernation caves support from 20,000 to 50,000 bats, it is easy to see how a large part of the total population can be affected by a single event. Episodes of large numbers of Indiana bat deaths have occurred due to human disturbance during hibernation.

Cave Commercialization and Improper Gating

The commercialization of caves – allowing visitors to tour caves during hibernation – drives bats away. Changes in the structure of caves, such as blocking an entrance, can change the temperature in a cave. A change of even a few degrees can make a cave unsuitable for hibernating bats. Some caves are fitted with gates to keep people out, but improper gating that prevents access by bats or alters air flow, temperature, or humidity can also be harmful. Properly constructed gates are beneficial because they keep people from disturbing hibernating bats while maintaining temperature and other requirements and allowing access for bats.

Summer Habitat Loss or Degradation

Indiana bats use trees as roosting and foraging sites during summer months.

Loss and fragmentation of forested habitats can affect bat populations.

Pesticides and Environmental Contaminants

Insect-eating bats may seem to have an unlimited food supply, but in local areas, insects may not be plentiful because of pesticide use. This can also affect the quality of the bats' food supply. Many scientists believe that population declines occurring today might be due, in part, to pesticides and environmental contaminants. Bats may be affected by eating contaminated insects, drinking contaminated water, or absorbing the chemicals while feeding in areas that have been recently treated.

What is Being Done to Prevent Extinction of the Indiana Bat?

Listing

Prompted by declining populations caused by disturbance of bats during hibernation and modification of hibernacula, the Indiana bat was listed in 1967 as "in danger of extinction" under the Endangered Species Preservation Act of 1966. It is listed as "endangered" under the current Endangered Species Act of 1973. Listing under the Endangered Species Act protects the Indiana bat from take (harming, harassing, killing) and requires Federal agencies to work to conserve it.

Recovery Plan

The Endangered Species Act requires that recovery plans be prepared for all listed species. The U.S. Fish and Wildlife Service developed a recovery plan for the Indiana bat in 1983 and is now revising that Plan. The recovery plan describes actions needed to help the bat recover.

Habitat Protection

Public lands like National Wildlife Refuges, military areas, and U.S. Forest Service lands are managed for Indiana bats by protecting forests. This means ensuring that there are the size and species of trees needed by Indiana bats for roosting; and providing a supply of dead and dying trees that can be used as roost sites. In addition, caves used for hibernation are managed to

maintain suitable conditions for hibernation and eliminate disturbance.

Education and Outreach

Understanding the important role played by Indiana bats is a key to conserving the species. Helping people learn more about the Indiana bat and other endangered species can lead to more effective recovery efforts.

U.S. Fish & Wildlife Service

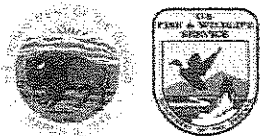
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<http://www.fws.gov/midwest/endangered>

December 2006



Rayed Bean (freshwater mussel)

Villosa fabalis

The rayed bean is a freshwater mussel that the U.S. Fish and Wildlife Service listed as an *endangered species*. Endangered species are animals and plants that are in danger of becoming extinct. *Threatened species* are animals and plants that are likely to become endangered in the foreseeable future. Identifying, protecting, and restoring endangered and threatened species are primary objectives of the U.S. Fish and Wildlife Service's endangered species program.

What is the Rayed Bean?

Appearance: The rayed bean is a small freshwater mussel, usually less than 1.5 inches long. Its shell is smooth-textured and green, yellowish-green, or brown with numerous dark-green wavy lines. The male's shell shape is generally elongated, whereas the female's is smaller and elliptical.

Range: The rayed bean historically was found across a wide expanse that included parts of the Midwest and eastern United States, north to Ontario, Canada. Once found in at least 115 streams, canals, and lakes, the rayed bean now occurs in only 31 streams and 1 lake; a 73 percent reduction in the number of occupied streams and lakes. The species has been extirpated from Illinois, Kentucky, and Virginia but is still found in Indiana, Michigan, New York, Ohio, Pennsylvania, and Ontario, Canada. After extirpation from Tennessee and West Virginia, reintroductions have restored the rayed bean to these states.



Photo by USFWS, Angela Boyer

The rayed bean, a small freshwater mussel of the upper Midwest and Eastern United States, is endangered due to population declines and continuing threats to the rivers where it can still be found.

Habitat: The rayed bean generally lives in smaller, headwater creeks, but it is sometimes found in large rivers and wave-washed areas of glacial lakes. It prefers gravel or sand substrates, and is often found in and around roots of aquatic vegetation. Adults spend their entire lives partially or completely buried in substrate, filtering water through their gills to remove algae, bacteria, detritus, microscopic animals, and dissolved organic material for food.

Reproduction: The life cycle of the rayed bean, like most freshwater mussels, is unusual and complex. Males release sperm into the water column that is then siphoned by females to fertilize their eggs. Fertilized eggs develop into microscopic larvae, called glochidia,

within special gill chambers. Females expel mature glochidia, which then must attach to the gills or fins of specific host fish species to complete development into juvenile mussels. After attaching to host fish, glochidia mature within a few weeks. Juvenile mussels then drop off and continue to grow, if they fall onto appropriate substrate. Using fish as a host species allows the rayed bean to move upstream and populate habitats it could not otherwise reach.

What threatens the rayed bean mussel?

Dams: Dams affect both upstream and downstream mussel populations by disrupting natural river flow patterns, scouring river bottoms, changing water temperatures, and eliminating habitat. Adapted to living in flowing water, the rayed bean

cannot survive in the still water impounded behind dams.

The rayed bean also depends on host fish as a means to move upstream. Because dams block fish passage, mussels are also prevented from moving upstream, which isolates upstream mussel populations from downstream populations, leading to small unstable populations more likely to die out.

Pollution: Adult mussels are easily harmed by toxins and degraded water quality from pollution because they are sedentary (they tend to stay in one place). Pollution may come from specific, identifiable sources such as accidental spills, factory discharges, sewage treatment plants and solid waste disposal sites or from diffuse sources like runoff from cultivated fields, pastures, cattle feedlots, poultry farms, mines, construction sites, private wastewater discharges, and roads. Contaminants may directly kill mussels, but they may also reduce water quality, affect the ability of surviving mussels to have young, or result in lower numbers or disappearance of host fish.

Sedimentation: Although sedimentation is a natural process, poor land use practices, dredging, impoundments, and other activities accelerate erosion and increase sedimentation. Sediment that blankets a river bottom can suffocate mussels. Accelerated sedimentation may also reduce feeding and respiratory ability for rayed bean mussels, leading to decreased growth, reproduction, and survival.

Nonnative Species: The invasion of the nonnative zebra mussel into the U.S. poses a serious threat. Zebra mussels proliferate in such high numbers that they use up food

resources and attach to native mussel shells in such large numbers that the native mussel cannot eat or breathe. Another invasive species, the round goby, is a nonnative fish species that may displace native host fish species, thus reducing the ability of the rayed bean to reproduce.

What is being done to conserve and restore rayed bean mussels?

Listing: In February 2012, the U.S. Fish and Wildlife Service added the rayed bean to the list of endangered species, giving the species full protection under the Endangered Species Act (ESA). The ESA provides protection against practices that kill or harm the species and requires planning for recovery and conservation actions.

Watershed Protection

Partnerships: The rayed bean cannot survive without help from watershed partnerships to restore habitat and improve surface lands. Causes of habitat degradation are numerous in streams throughout its range. Often, threats are not from actions in or adjacent to rivers, but from widespread problems on uplands at the highest elevations of watersheds. Habitat restoration will require improvements across the entire watershed. The voluntary assistance of federal and state agencies, conservation groups, local governments, private landowners, industries, businesses, and farming communities will be necessary to meet recovery goals.

Reintroductions: The rayed bean was extirpated from Tennessee and West Virginia, but reintroductions into suitable habitat have reestablished the species in these states. Reintroductions were in

rivers where water quality and habitat have improved since the rayed bean was extirpated.

What can you do?

Learn more about how the destruction of habitat leads to loss of endangered and threatened species and our nation's plant and animal diversity. Discuss with others what you have learned.

Help improve water quality locally in streams by minimizing use of lawn-care chemicals and properly disposing of or recycling hazardous materials found in your home, like batteries, paint, car oil, and pesticides.

When boating, please follow any rules established to prevent the spread of exotic pests like the zebra mussel.

Join a conservation group or volunteer at a local nature center, zoo, or wildlife refuge.

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January 2012



Snuffbox (freshwater mussel)

Epioblasma triquetra

The snuffbox is a freshwater mussel that is listed as an *endangered species*. Endangered species are animals and plants that are in danger of becoming extinct. *Threatened species* are animals and plants that are likely to become endangered in the foreseeable future. Identifying, protecting, and restoring endangered and threatened species are primary objectives of the U.S. Fish and Wildlife Service's endangered species program.

What is the Snuffbox?

Appearance: The snuffbox is a small- to medium-sized freshwater mussel with a yellow, green or brown shell interrupted with green rays, blotches or chevron-shaped lines. The shell becomes darker and the interruptions less clear with age. Shell shape is typically triangular in females and oblong or ovate in males. Males can grow up to 2.8 inches, with females reaching only up to 1.8 inches.

Range: Historically the snuffbox was widespread, occurring in 210 streams and lakes in 18 states and Ontario, Canada. The population has been reduced to 79 streams and lakes in 14 states and Ontario, representing a 62 percent rangewide decline. The snuffbox is currently found in Alabama, Arkansas, Illinois, Indiana, Kentucky, Michigan, Minnesota, Missouri, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, Wisconsin, and Ontario, Canada. Most populations are small and geographically isolated from one another, further increasing their risk of extinction.



Photo by Dr. Chris Barnhart, Missouri State University

The logperch is a host fish for snuffbox mussels. In this photo, a logperch approached the female mussel, which then snapped shut. Oftentimes, the mussel will snap closed on a fish's head or snout, ensuring that glochidia are released into the fish's gills.

Habitat: The snuffbox is usually found in small- to medium-sized creeks, inhabiting areas with a swift current, although it is also found in Lake Erie and some larger rivers. Adults often burrow deep in sand, gravel or cobble substrates, except when they are spawning or the females are attempting to attract host fish. They are suspension-feeders, typically feeding on algae, bacteria, detritus, microscopic animals, and dissolved organic material.

Reproduction: The life cycle of the snuffbox, like most freshwater mussels, is unusual and complex. Males release sperm into the water column that is then siphoned by females to fertilize their eggs. Fertilized eggs develop into

microscopic larvae, called glochidia, within special gill chambers. After brooding for up to 7 months, females expel mature glochidia, which then must attach to the gills or fins of specific host fish species to complete development into juvenile mussels. If successfully attached to a host fish, glochidia mature within a few weeks. Juvenile mussels then drop off and continue to grow, if they fall onto appropriate substrate. Using host fish allows the snuffbox to move upstream and populate habitats it could not otherwise reach.

What threatens the snuffbox mussel?

Dams: Dams affect both upstream and downstream mussel populations by disrupting natural river flow patterns, scouring river bottoms, changing water temperatures, and

eliminating habitat. Adapted to living in flowing water, the snuffbox cannot survive in the lakes or slow water created by dams.

Snuffbox mussels depend on host fish to move upstream. Because dams block fish passage, they also prevent mussels from moving upstream, isolating downstream mussels from upstream populations. This fragmentation leads to small, unstable populations that easily die out.

Pollution: Adult mussels, because they are sedentary (meaning that they tend to stay in one place), are easily harmed by toxins and poor water quality caused by pollution. Pollution may come from specific, identifiable sources such as accidental spills, factory discharges, sewage treatment plants and solid waste disposal sites or from diffuse sources like runoff from cultivated fields, pastures, cattle feedlots, poultry farms, mines, construction sites, private wastewater discharges, and roads. Contaminants may directly kill mussels, but they may also reduce water quality, affect the ability of surviving mussels to have young, or result in lower numbers or disappearance of host fish.

Sedimentation: Although sedimentation is a natural process, poor land use practices, dredging, impoundments, intensive timber harvesting, heavy recreational use, and other activities accelerate erosion and increase sedimentation. Sediment that blankets a river bottom can suffocate mussels. Accelerated sedimentation may also reduce feeding and respiratory ability for snuffbox mussels, leading to decreased growth, reproduction, and survival.

Nonnative Species: The invasion of the nonnative zebra mussel into the U.S. poses a serious threat. Zebra mussels proliferate in such high numbers that they use up food

resources and attach to native mussel shells in such large numbers that the native mussel cannot eat or breath. Another invasive species, the round goby, is a nonnative fish species that may displace native host fish species, thus reducing the ability of the snuffbox to reproduce.

What is being done to conserve and restore snuffbox mussels?

Listing: In February 2012, the U.S. Fish and Wildlife added the snuffbox to the list of endangered species giving the species full protection under the Endangered Species Act. The ESA provides protection against practices that kill or harm the species and requires planning for recovery and conservation actions.

Watershed Protection

Partnerships: The snuffbox cannot survive without help from watershed partnerships to restore habitat and improve surface lands. Causes of habitat degradation are numerous in streams throughout its range. In many cases, the threats are not from actions in or adjacent to rivers, rather, threats are from widespread problems on uplands at the highest elevations of watersheds. Habitat restoration will require improvements across the entire watershed. The voluntary assistance of federal and state agencies, conservation groups, local governments, private landowners, industries, businesses, and farming communities will be necessary to meet recovery goals.

What can you do?

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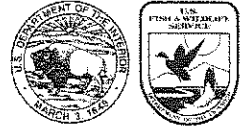
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News Release

Midwest Region



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FOR IMMEDIATE RELEASE

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U.S. Fish and Wildlife Service Designates Critical Habitat for Two Prairie Butterflies Under the Endangered Species Act

The U.S. Fish and Wildlife Service today announced final critical habitat designations for the Dakota skipper and Poweshiek skipperling, two species of prairie butterflies listed under the Endangered Species Act in 2014.

The Service designated about 19,900 acres of critical habitat in 38 units in Minnesota, North Dakota and South Dakota for the threatened Dakota skipper, and about 25,900 acres in 56 units in Iowa, Michigan, Minnesota, North Dakota, South Dakota and Wisconsin for the endangered Poweshiek skipperling. Of the total 33,742 acres of critical habitat, about 12,050 acres is common to both species.

Critical habitat is defined in the Endangered Species Act as an area that contains habitat features that are essential for the survival and recovery of a listed species, which may require special management considerations or protections. The Act requires the Service to consider which areas are needed for a species' recovery. Regulation of critical habitat is limited to the requirement that *federal agencies* consult with the Service on any actions that may affect critical habitat. The Service can then recommend ways to minimize adverse effects to the habitat.

A critical habitat designation imposes no requirements on state or private actions on non-federal lands where no federal funding, permits or approvals are required. Designation of critical habitat does not affect land ownership and does not allow the government to take or manage private property; nor does it establish a refuge, wilderness, reserve, preserve or other conservation area. It does not allow government or public access to private lands.

The Service's final critical habitat designation for the two butterflies is 8,175 acres fewer than proposed. Some areas originally proposed were excluded because conservation agreements are in place to conserve the species. Some areas were modified based on biological information; areas with unsuitable habitat were removed, and areas that were found to have suitable habitat were added. In total, these changes amounted to reductions of 7,879 acres for the Dakota skipper and 296 acres for the Poweshiek skipperling.

"That these butterflies have survived at all is because of the good stewardship of some of the region's landowners," said Tom Melius, the Service's Midwest Regional Director. "We will continue to work with these and other landowners to ensure the conservation of remnant prairie habitat and these prairie butterflies."

Found in Minnesota, North Dakota, South Dakota and Canada, the Dakota skipper has experienced a dramatic decline in numbers and no longer occurs on half the sites where previously found.

The Poweshiek skipperling has also experienced a recent, dramatic decline in numbers. Once found in eight states and Canada, it now occurs only in a few native prairie remnants in Wisconsin and Michigan, and in Manitoba, Canada. Surveys indicate that Poweshiek skipperlings are gone from about 96 percent of the sites where they were known to occur.

Prairie remnants that are home to these butterflies are some of the few natural areas present across the predominately agricultural landscape of the Dakotas and western Minnesota. These prairie grasslands support a diverse array of native wildlife including grassland birds such as the sharp-tailed grouse, blue-winged teal, mallards and other waterfowl, prairie plants such as big and little bluestem and the pasque flower, and many species of pollinators, such as the monarch butterfly. These grasslands also protect watersheds by increasing water infiltration and water yield, provide improved water quality due to the lack of fertilizer, pesticide and herbicide use. Recent studies have found diverse native prairie plants sequester large amounts of carbon.

For more information about the Dakota skipper, the Poweshiek skipperling, and the final critical habitat designation, go to www.fws.gov/midwest/endangered

The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people. We are both a leader and trusted partner in fish and wildlife conservation, known for our scientific excellence, stewardship of lands and natural resources, dedicated professionals and commitment to public service. For more information on our work and the people who make it happen, visit <http://www.fws.gov>.

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U.S. Fish & Wildlife Service

Poweshiek Skipperling

Oarisma poweshiek

The Poweshiek skipperling is listed as endangered under the Endangered Species Act. Endangered species are animals and plants that are in danger of becoming extinct. Identifying, protecting and restoring endangered species is a primary objective of the U.S. Fish and Wildlife Service's endangered species program.

What is the Poweshiek skipperling?

Appearance: The Poweshiek skipperling is a small butterfly with a wing-span of about 1 inch. It is dark brown above with some light orange along the wing margins and a lighter orange head. The underside of the wings, which can be seen when it's at rest, are dark to light brown with very prominent white veins that may make the wing look striped.

Habitat: Poweshiek skipperlings live in high quality tallgrass prairie in both upland, dry areas as well as low, moist areas. In Michigan they are found mainly in prairie fens, a type of wet prairie.

Reproduction: Poweshiek skipperling larvae (caterpillars) hibernate on the ground during winter; they resume activity in spring and continue developing until they pupate and emerge as adult butterflies between mid-June and mid-July. Adults have a short lifespan of only one to two weeks and during this time they mate and lay eggs. Larvae hatch during late summer; they feed and develop through early fall and then overwinter to continue development the following spring.

Feeding Habits: Adult butterflies feed on nectar from prairie flowers

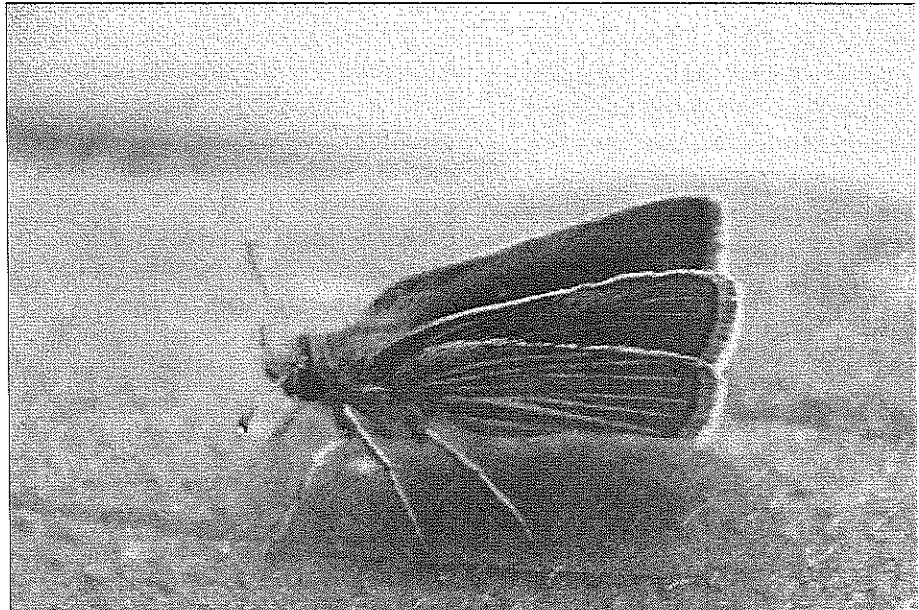
such as purple coneflower (*Echinacea angustifolia*), blackeyed susan (*Rudbeckia hirta*) and palespike lobelia (*Lobelia spicata*). Because limited research has been done on the Poweshiek skipperling, we are not certain which plant species are necessary for the larvae to develop, although we know they select native, fine-stemmed grasses and sedges such as little bluestem (*Schizachyrium scoparium*) and prairie dropseed (*Sporobolus heterolepis*).

Range: Historically, Poweshiek skipperlings were found in tallgrass prairie and prairie fens from Manitoba to Iowa, with populations also found in Michigan and Wisconsin. Unfortunately, the range is now much less and has been declining for some time. The Poweshiek skipperling may have been extirpated from the Dakotas,

Minnesota and Iowa within the last 10 years – an area that, until recently, contained the vast majority of the surviving populations. It is now known only from Wisconsin, Michigan and Manitoba. During surveys in 2014, the species could be found only at a few sites in a single Michigan county, in very limited numbers at one site in Wisconsin, and in Canada at the single Manitoba site.

Why is the Poweshiek skipperling an endangered species?

Habitat Loss and Fragmentation: Only about 4 percent of the original tallgrass native prairie in the United States remains. Much of what is left is in small, isolated sites, so the butterfly generally cannot move from site to site. If the Poweshiek skipperling is lost at a site, there are often no nearby populations to recolonize.



The future of the Poweshiek skipperling may depend on captive propagation combined with reintroductions. This skipperling was reared at the Minnesota zoo.

Photo Courtesy of the Minnesota Zoo/Erik Runquist

Habitat Management: In addition to the loss of large blocks of contiguous prairie, the native grasslands that remain are often not managed in ways that can support Poweshiek skipperlings. Historically, wildfire helped maintain the treeless nature of prairies. Today, grazing, haying and prescribed burns may replicate that effect. However, grazing or burning that is too intense, too frequent or conducted during the wrong time of the year may not create conditions suitable for the Poweshiek or may kill too many of the butterflies to sustain the population.

What is being done to conserve the Poweshiek skipperling?

Listing: Listing the Poweshiek skipperling as endangered under the Endangered Species Act will help focus attention and funds on the butterfly and the habitat that it needs to survive.

Research: We have limited information on the Poweshiek skipperling's life history and exact habitat requirements. Research is needed to determine land management regimes that will help this butterfly survive and provide information that may allow us to reintroduce it into formerly occupied habitats. A study is ongoing to understand the genetic diversity of surviving populations. This information will help us determine if management is needed to increase diversity of remaining populations and will help ensure any captive propagation will result in genetically robust populations. In addition, researchers are looking into potential causes for the sharp and widespread decline of the species that has occurred during the past 10 to 20 years.

Habitat Protection and

Management: Where possible, high quality prairie and prairie fens need to be protected and

appropriately managed. These may be publicly owned lands or they may be protected through easements and financial incentives on private lands. In light of the species' highly endangered status, its conservation in the wild may only be secured by placing a high priority on conserving remaining populations. Attempts are being made to develop methods to propagate the species in captivity, but it will be unusually difficult to keep in captivity. Therefore, conservation of the few remaining wild populations is extremely important. The Service will cooperate with conservation partners to control and remove invasive species, such as glossy buckthorn (*Frangula alnus*), and to undertake other actions that will alleviate threats to remaining populations and improve their viability.

What can I do to help prevent extinction of the species?

Spread the Word: Learn more about the Poweshiek skipperling and other rare and declining species. Understand how the destruction of habitat leads to loss our nation's plant and animal diversity. Tell others what you have learned.

Join: Join a conservation group; many have local chapters, or volunteer at a local nature center, zoo or National Wildlife Refuge.

Native plants: Provide habitat for butterflies by planting native vegetation in your yard. Avoid using invasive non-native plants like purple loosestrife and dame's rocket and remove invasive non-natives, like buckthorn and honeysuckle if they invade your yard.

Minimize: Use as little herbicide, insecticide and fertilizer as possible or avoid pesticides and insecticides entirely. Pesticides may harm butterflies and other pollinators and, along with fertilizers, can harm water quality.

Poweshiek Skipperling Critical Habitat

Michigan Unit 1, Oakland County



Legend

Poweshiek Skipperling Critical Habitat

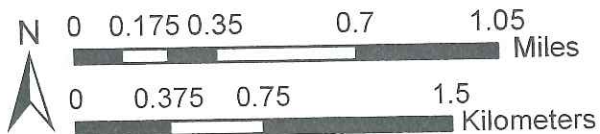
City or Town

Highways

Local Roads

County

Major Water

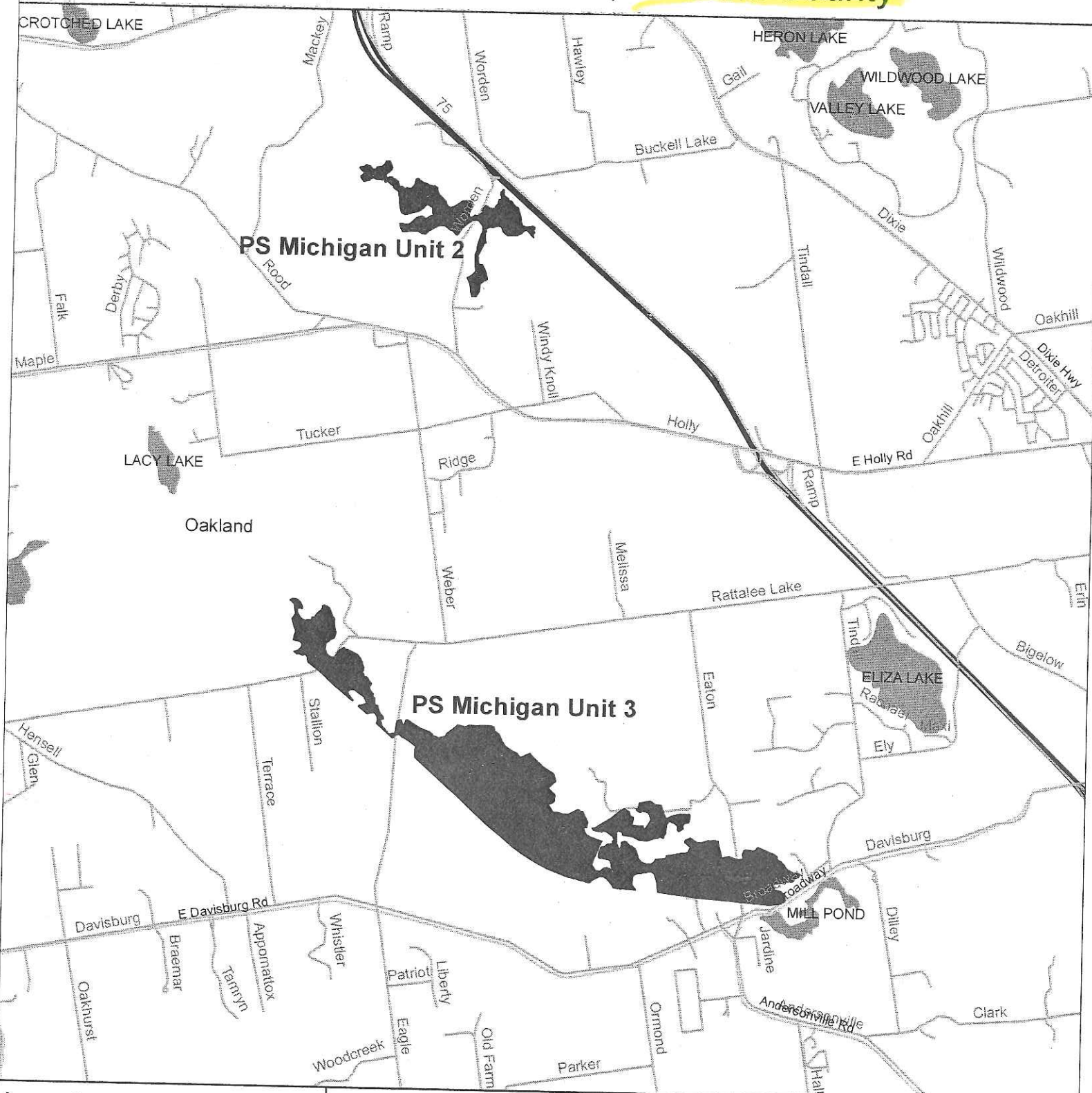


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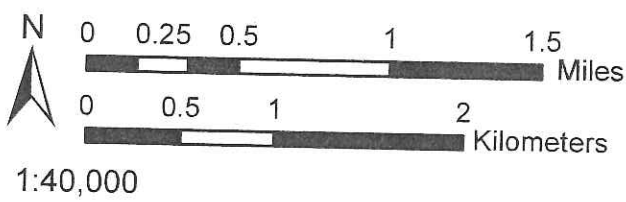


Poweshiek Skipperling Critical Habitat

Michigan Units 2 and 3, Oakland County



- Legend**
- Poweshiek Skipperling Critical Habitat
 - City or Town
 - Highways
 - Local Roads
 - County
 - Major Water



Poweshiek Skipperling Critical Habitat

Michigan Unit 4, Oakland County



Legend

- Poweshiek Skipperling Critical Habitat
- City or Town
- Highways
- Local Roads
- County



0 0.25 0.5 1 1.5 Miles

0 0.5 1 2 Kilometers

1:40,000



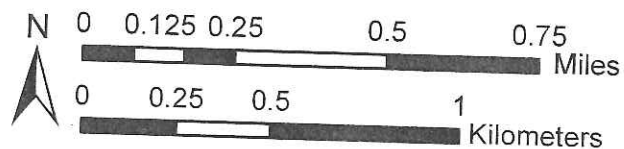
Poweshiek Skipperling Critical Habitat

Michigan Unit 5, Livingston County



Legend

- Poweshiek Skipperling Critical Habitat
- City or Town
- Highways
- Local Roads
- County
- Major Water



1:20,000





U.S. Fish & Wildlife Service

Eastern Massasauga *Sistrurus catenatus*

The eastern massasauga rattlesnake has been listed as a threatened species under the Endangered Species Act. Threatened species are animals and plants that are likely to become endangered in the foreseeable future. Identifying, protecting, and restoring endangered and threatened species is the primary objective of the U.S. Fish and Wildlife Service's endangered species program.

What is an eastern massasauga rattlesnake?

Appearance: Massasaugas are small snakes with thick bodies, heart-shaped heads and vertical pupils. The average length of an adult is about 2 feet. Adult massasaugas are gray or light brown with large, light-edged chocolate brown blotches on the back and smaller blotches on the sides. Young snakes have the same markings, but are more vividly colored. Other snakes that look similar include the fox snake, milk snake and hognose snake.

Habitat: Massasaugas live in wet areas including wet prairies, marshes and low areas along rivers and lakes. In many areas massasaugas also use adjacent uplands during part of the year. They often hibernate in crayfish burrows but may also be found under logs and tree roots or in small mammal burrows. Unlike other rattlesnakes, massasaugas

Reproduction: Like all rattlesnakes, massasaugas bear live young. Depending on their health, adult females may bear young every year or every other year. When food is especially scarce they may only have young every three years. Most massasaugas mate in late summer, and give birth about a year later. Litter size varies from 5 to 20 young.

Feeding Habits: Massasaugas eat small rodents such as mice and voles but they sometimes eat frogs and other snakes. They hunt by sitting and waiting. Heat sensitive pits near the snakes' eyes alert the snake to the presence of prey. They can find their prey by sight, by feeling vibrations, by sensing heat given off by their prey, and by detecting chemicals given off by the animal (like odors).

Range: Eastern massasaugas live in an area that extends from central New York and southern Ontario to southcentral Illinois and eastern Iowa. Historically, the snake's range covered this



Photo courtesy of Dan Kennedy, Michigan DNR

Massasaugas are docile, secretive snakes that will try to escape rather than fight. But they will protect themselves and may bite if cornered. Be cautious in massasauga areas by wearing leather boots or shoes, watching where you place your hands and feet and walking around, rather than over, fallen logs. Treat massasaugas with respect, like any wild animal. If you are bitten by a massasauga, seek medical help immediately.

same area, but within this large area the number of populations and numbers of snakes within populations have steadily shrunk. Generally, only small, isolated populations remain. The eastern massasauga is listed as endangered, threatened, or a species of concern in every state and province where it is found.

Why has the eastern massasauga been listed as a threatened species?

Eradication: People seem to have an innate fear of snakes and fear of venomous snakes is particularly strong. Massasaugas are often killed when they show up near homes or businesses, and people may go out of their way to kill or even eliminate them. Indeed, many states had bounties on all rattlesnakes, including massasaugas.

Habitat loss: Massasaugas depend on wetlands for food and shelter and often use nearby upland areas during part of the year. Draining wetlands for farms, roads, homes, and urban expansion has eliminated much of the massasauga habitat. Also, massasaugas are not long distance travelers, so roads, towns, and farm fields prevent them from moving between the wetland and upland habitats they need. These same barriers also separate and isolate remaining populations from each other. Small, isolated populations often continue on a downward spiral until the massasauga is lost from those areas.

Management: Lack of management and improper timing of management are threats to

massasaugas. The snake's habitat needs vegetation control such as prescribed fire and mowing to prevent invasion of shrubs, trees and non-native plants. Woody plant invasion is reducing the amount of available habitat in some areas. Where land is managed to prevent woody invasion, snakes may be killed by prescribed fire and mowing when it happens after snakes emerge from hibernation.

What is being done to conserve the eastern massasauga?

Research: Researchers are studying the eastern massasauga to learn about its life history, about how it uses its habitat, and how we can manage for it and its habitat.

Habitat Management: Many remaining populations of massasaugas are on public land and privately owned natural areas. Some land management practices on those properties harm massasaugas. The Service is working with willing land managers to practice techniques that allow traditional management goals to continue but avoid harming the massasauga and its habitat.

Education: Although many people have an innate fear of massasaugas, it is actually a secretive, docile snake that strikes humans only when it feels threatened and cornered. Living, working, or recreating in massasauga areas does require caution, but the massasauga is also an important and beautiful part of the natural heritage of those areas. We hope that

education about the docile nature of the snake, its habits, and its role in the ecosystem will help people feel more comfortable living with this rare creature.

Why do we want to conserve the eastern massasauga?

Ecosystem Role: The massasauga plays an important role in its ecosystems, both as a predator on small mammals, other snakes, and amphibians and as prey for hawks, owls, cranes, and some mammals.

Indicator Species: The fact that massasaugas are in serious decline is a warning bell telling us that something is wrong. The story of the massasauga is similar to the story of many plants and animals that need wetlands or a combination of wetlands and uplands to survive. When we drain wetlands and develop in natural areas, we push our wild plants and animals onto ever smaller isolated islands of habitat where it is difficult for them to survive. By conserving massasaugas, we conserve natural systems that support many species of plants and animals.

*U.S. Fish & Wildlife Service
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September 2016